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A method of constructing a composite structure, comprising:
positioning a plurality of forming elements on a skin panel formed
from a composite material in a predetermined configuration;

disposing a stiffening panel formed from an uncured composite material outwardly from the forming elements to create a plurality of contact regions between the skin panel and the stiffening panel; and

curing the skin panel and the stiffening panel to bond the skin panel and the stiffening panel together at the contact regions.

- 2. The method of Claim 1, further comprising removing the forming elements after curing the skin panel and the stiffening panel.
- 3. The method of Claim 1, further comprising coupling the skin panel and the stiffening panel with a plurality of fasteners.
- 4. The method of Claim 3, wherein coupling the skin panel and the stiffening panel with the fasteners comprises coupling the skin panel and the stiffening panel with a plurality of Z-pins proximate the contact regions.
- The method of Claim 1, wherein the skin panel is formed from a composite material selected from the group consisting of a cured composite material and an uncured composite material.
- (1) 6. The method of Claim 1, wherein disposing the stiffening panel comprises spraying a composite material outwardly from the forming elements.
- 7. The method of Claim 1, wherein disposing the stiffening panel formed from the uncured composite material comprises disposing a stiffening panel formed from an uncured composite material having a plurality of discontinuous fibers.





- 8. The method of Claim 1, wherein positioning the forming elements on the skin panel in the predetermined configuration comprises positioning the forming elements in a corrugated configuration.
- 5 9. The method of Claim 1, wherein positioning the forming elements on the skin panel in the predetermined configuration comprises positioning the forming elements in a waffle configuration.

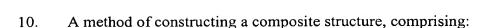
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positioning a plurality of forming elements on a skin panel formed from a composite material in a corrugated configuration;

disposing a stiffening panel formed from an uncured composite material having a plurality of discontinuous fibers outwardly from the skin panel and the forming elements;

partial-curing the skin panel and the stiffening panel to create a plurality of first contact regions between the skin panel and the stiffening panel and to create a plurality of second contact regions between the forming elements and the stiffening panel;

coupling the skin panel and the stiffening panel with a plurality of fasteners proximate the first contact regions; and

final curing the skin panel and the stiffening panel to bond the skin panel and the stiffening panel together at the first contact regions.

- 11. The method of Claim 10, further comprising removing the forming elements after final curing the skin panel and the stiffening panel.
- 12. The method of Claim 11, wherein coupling the skin panel and the stiffening panel with the fasteners comprises coupling the skin panel and the stiffening panel with a plurality of Z-pins proximate the first contact regions.
- 13. The method of Claim 10, wherein the skin panel is formed from a composite material selected from the group consisting of a partially-cured composite material and an uncured composite material.
- 14. The method of Claim 10, wherein disposing the stiffening panel comprises spraying a composite material outwardly from the forming elements.

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15. A method of constructing a composite structure, comprising:

positioning a plurality of forming elements on a first surface of a skin panel formed from a composite material selected from the group consisting of a cured composite material and an uncured composite material, the forming elements and the first surface of the skin panel creating a predetermined configuration;

forming a stiffening panel from an uncured composite material having a plurality of discontinuous fibers on a tool having a configuration substantially the same as the predetermined configuration;

heating the stiffening panel to a state sufficient enough to enable handling of the stiffening panel while maintaining its configuration;

disposing the stiffening panel outwardly from the skin panel and the forming elements to create a plurality of first contact regions between the skin panel and the stiffening panel and to create a plurality of second contact regions between the forming elements and the stiffening panel; and

curing the skin panel and the stiffening panel to bond the skin panel and the stiffening panel together at the first contact regions.

- 16. The method of Claim 15, further comprising removing the forming elements after curing the skin panel and the stiffening panel.
- 17. The method of Claim 15, wherein coupling the skin panel and the stiffening panel with the fasteners comprises coupling the skin panel and the stiffening panel with a plurality of Z-pins proximate the contact regions.
- 18. The method of Claim 15, wherein the predetermined configuration is a corrugated configuration.
- 19. The method of Claim 15, wherein the predetermined configuration is a waffle configuration.





20. A composite structure, comprising:

- a skin panel formed from a composite material;
- a plurality of forming elements positioned on the skin panel in a corrugated configuration;

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- a stiffening panel formed from an uncured composite material having a plurality of discontinuous fibers disposed outwardly from the skin panel and the forming elements;
- a plurality of contact regions created by the skin panel and the stiffening panel;
- a plurality of fasteners coupling the skin panel and the stiffening panel proximate the contact regions; and
- a plurality of bonding regions proximate the contact regions, the bonding regions created by curing the skin panel and the stiffening panel.
- 21. The composite structure of Claim 20, wherein the fasteners are Z-pins.
- 22. The composite structure of Claim 20, wherein the skin panel is formed from a composite material selected from the group consisting of a cured composite material and an uncured composite material.
- 23. The composite structure of Claim 20, wherein the stiffening panel is sprayed on the forming elements and the skin panel.

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